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DATA PROCESSING SYSTEM INPUT POINTING DEVICE INCLUDING MEANS AND METHOD FOR CONTROLLING AUDIO OUTPUT

1. Technical Field:

The present invention relates generally to data processing systems, and more particularly to input pointing devices for inputting data into data processing systems. Still more particularly, the present invention relates to a data processing system input pointing device having a control device for controlling an audio output of the data processing system in response to a movement of the control device.

2. Description of Related Art:

Input devices, such as keyboards, are utilized to input data into a computer system. The use of an input pointing device, such as a mouse or joystick, simplifies many computer operations. Although keyboards are input devices, they are not considered "input pointing devices".

It is known to include a cursor control device on either a keyboard or a mouse. The cursor control device is a joystick-type control capable of moving a cursor. Such a cursor control device is known as a "Trackpoint™". Trackpoint™ is a trademark of International Business Machines Corporation.

It is also known to include a scroll device on a top of a mouse. The scroll device is capable of scrolling the screen currently being displayed. A scroll device controls scrolling and does not change the current position of the cursor.

A user may utilize a keyboard in order to change the

audio output of the data processing system. On some keyboards, a volume control device is included on top of the keyboard. The volume control device may be implemented as a rocker switch which when depressed on the top of the switch will increase the volume, and when depressed on the bottom of the switch will decrease the volume. Additional knobs have been included along with the volume switch which are separate from the volume switch. The additional knobs may be used to play an audio selection, pause the current selection, jump to the next audio selection, or jump back to the previous audio selection.

In order to use the keyboard audio control devices if the user is currently using the mouse, a user must lift his/her hand from the mouse and then manipulate the appropriate knob(s). A user typically uses the mouse to select an audio file to be heard and to perform other functions. For example, the user may use the mouse to select the desired function from a control screen displayed on the computer screen. The user may then use the mouse to move the cursor to the desired function, and then select the function to control the audio output.

When the user wishes to control the audio output, the user must either use the mouse to move the cursor to the appropriate function or the user must move his/her hand back to the keyboard. It can become very inconvenient to continue to jump back and forth between the mouse and the keyboard.

Therefore, a need exists for a data processing system input pointing device that includes a single control device for controlling an audio output of the data processing system.

SUMMARY OF THE INVENTION

A data processing system input pointing device is described. The input pointing device includes a single control device on a side of the device. The control device may be used to control an audio output of the data processing system in response to different movements of the control device.

The above as well as additional objectives, features, and advantages of the present invention will become apparent in the following detailed written description.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 is pictorial representation of a distributed data processing system in which the present invention may be implemented;

Figure 2 is a block diagram of a data processing system which may be implemented as a server in which the present invention may be included in accordance with the present invention;

Figure 3 is a block diagram of a data processing system which may be implemented as a client in which the present invention may be included in accordance with the present invention;

Figure 4 is a side view of a mouse which includes an audio control device in accordance with the present invention;

Figure 5 is a top view of the mouse of **Figure 4** in accordance with the present invention; and

Figure 6 is a high level flow chart which depicts utilizing an audio control device included within a mouse in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment of the present invention and its advantages are better understood by referring to the figures, like numerals being used for like and corresponding parts of the accompanying figures.

The present invention is an input pointing device including an audio control device for controlling an audio output of the data processing system. Preferably, the present invention is implemented as a single audio wheel include on the side of a mouse. The single audio wheel may be used to increase the volume of the audio output, decrease volume, toggle a mute on and off, fast forward through a current audio selection, and rewind through a current audio selection. All of the functions are provided through the single audio wheel.

With reference now to the figures, and in particular with reference to **Figure 1**, a pictorial representation of a distributed data processing system is depicted in which the present invention may be implemented. Distributed data processing system **100** is a network of computers in which the present invention may be implemented.

Distributed data processing system **100** contains network **102**, which is the medium used to provide communications links between various devices and computers connected within distributed data processing system **100**. Network **102** may include permanent connections, such as wire or fiber optic cables, or temporary connections made through telephone connections.

In the depicted example, server **104** is connected to network **102**, along with storage unit **106**. In addition, clients **108**, **110**, and **112** are also connected to network

102. These clients, **108**, **110**, and **112**, may be, for example, personal computers, network computers, personal digital assistants, data network compatible cellular devices, cable or satellite TV set-top boxes, Internet ready game consoles, and the like. For purposes of this application, a network computer is any computer coupled to a network which receives a program or other application from another computer coupled to the network. In the depicted example, server **104** provides data, such as boot files, operating system images and applications, to clients **108-112**. Clients **108**, **110**, and **112** are clients to server **104**. Distributed data processing system **100** may include additional servers, clients, and other devices not shown.

Distributed data processing system **100** may be the Internet, with network **102** representing a worldwide collection of networks and gateways that use the TCP/IP suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers consisting of thousands of commercial, government, education, and other computer systems that route data and messages. Of course, distributed data processing system **100** also may be implemented as a number of different types of networks such as, for example, an intranet or a local area network. **Figure 1** is intended as an example and not as an architectural limitation for the processes of the present invention.

Figure 2 illustrates a block diagram of a data processing system which may be implemented as a server, such as server **104** in **Figure 1**, in accordance with the present invention. Data processing system **200** may be a

symmetric multiprocessor (SMP) system including a plurality of processors **202** and **204** connected to system bus **206**. Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. I/O bus bridge **210** is connected to system bus **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted. Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212** provides an interface to PCI local bus **216**. A number of modems **218-220** may be connected to PCI bus **216**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors. Communications links to network computers **108-112** in **Figure 1** may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards. Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI buses **226** and **228**, from which additional modems or network adapters may be supported. In this manner, server **200** allows connections to multiple network computers. A memory mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention. The data processing

system depicted in **Figure 2** may be, for example, an IBM RISC/System 6000, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) operating system.

Figure 3 illustrates a block diagram of a data processing system in which the present invention may be implemented. Data processing system **300** is an example of a client computer. Data processing system **300** employs a peripheral component interconnect (PCI) local bus architecture. Although the depicted example employs a PCI bus, other bus architectures, such as Micro Channel or ISA, may be used.

Processor **302** and main memory **304** are connected to PCI local bus **306** through PCI bridge **308**. PCI bridge **308** may also include an integrated memory controller and cache memory for processor **302**. Additional connections to PCI local bus **306** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **310**, SCSI host bus adapter **312**, and expansion bus interface **314** are connected to PCI local bus **306** by direct component connection.

In contrast, audio adapter **316**, graphics adapter **318**, and audio/video adapter (A/V) **319** are connected to PCI local bus **306** by add-in boards inserted into expansion slots. Expansion bus interface **314** provides a connection for a keyboard and mouse adapter **320**, modem **322**, and additional memory **324**.

In the depicted example, SCSI host bus adapter **312** provides a connection for hard disk drive **326**, tape drive **328**, CD-ROM drive **330**, and digital video disc read only

memory drive (DVD-ROM) **332**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **302** and is used to coordinate and provide control of various components within data processing system **300** in **Figure 3**. The operating system may be a commercially available operating system, such as Windows 2000, which is available from Microsoft Corporation. Windows is a trademark of Microsoft Corporation. In a preferred embodiment, the operating system is a UNIX-type operating system.

An object oriented programming system, such as Java, may run in conjunction with the operating system, providing calls to the operating system from Java programs or applications executing on data processing system **300**. Instructions for the operating system, the object-oriented operating system, and applications or programs are located on a storage device, such as hard disk drive 3**26**, and may be loaded into main memory **304** for execution by processor **302**.

Those of ordinary skill in the art will appreciate that the hardware in **Figure 3** may vary depending on the implementation. For example, other peripheral devices, such as optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 3**. The depicted example is not meant to imply architectural limitations with respect to the present invention. For example, the processes of the present invention may be applied to multiprocessor data processing systems.

Figure 4 is a side view of a mouse **400** which includes an audio control device **402** in accordance with the present invention. **Figure 5** is a top view of the mouse of **Figure 4** in accordance with the present invention. Mouse **400** may be utilized with any of the data processing systems depicted in **Figures 1-3.**

Audio control device **402** is included on a side of mouse **400.** Audio control device **402** is preferably implemented as a moveable wheel, such as a thumb-wheel.

Figure 6 is a high level flow chart which depicts utilizing an audio control device included within a mouse in accordance with the present invention. The process starts as depicted by block **600** and thereafter passes to block **602** which illustrates a determination of whether or not the audio wheel has been moved forward. If a determination is made that the audio wheel has been moved forward, the process passes to block **604** which depicts increasing the volume in proportion to the amount the wheel was moved forward. The process then passes back to block **602.**

Referring again to block **602,** if a determination is made that the audio wheel has not been moved forward, the process passes to block **606** which illustrates a determination of whether or not the wheel has been moved backward. If a determination is made that the wheel has been moved backward, the process passes to block **608** which depicts decreasing the volume in proportion to the amount the wheel was moved backward. The process then passes back to block **602.**

Referring again to block **606,** if a determination is made that the audio wheel has not been moved backward, the

process passes to block **610** which illustrates a determination of whether or not the wheel has been depressed twice quickly and consecutively. If a determination is made that the wheel has been depressed twice quickly and consecutively, the process passes to block **612** which depicts toggling the mute on/off. The process then passes back to block **602**.

Referring again to block **610**, if a determination is made that the audio wheel has not been depressed twice quickly and consecutively, the process passes to block **614** which illustrates a determination of whether or not the wheel has been depressed while being simultaneously moved forward. If a determination is made that the wheel has been depressed while being simultaneously moved forward, the process passes to block **616** which depicts fast forwarding through the current audio selection as long as the wheel is being depressed and moved forward. The process then passes back to block **602**.

Referring again to block **614**, if a determination is made that the audio wheel has not been depressed while being simultaneously moved forward, the process passes to block **618** which illustrates a determination of whether or not the wheel has been depressed while being simultaneously moved backward. If a determination is made that the wheel has been depressed while being simultaneously moved backward, the process passes to block **620** which depicts rewinding through the current audio selection as long as the wheel is being depressed and moved backward. The process then passes back to block **602**.

Referring again to block **618**, if a determination is made that the audio wheel has not been depressed while

being simultaneously moved backward, the process passes back to block **602**.

It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media such a floppy disc, a hard disk drive, a RAM, CD-ROMs, and transmission-type media such as digital and analog communications links.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.